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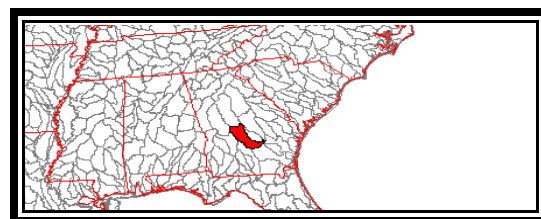
# TMDLs: A Simplified Approach

## What Is A Model?

Models are ordinarily thought of as mathematical representations of some environmental processes that can be used to evaluate the way pollutants interact with the environment. However, models require parameter data in order to develop properties of the system, which provide instructions of how these processes and pollutants interact. These parameters may vary from place to place. The purpose of a mathematical model is to produce numbers. These numbers are the model's predictions of what natural or man-made systems will do under a certain simulation regime.



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## What A Model Looks Like

Models are often used to infer reality by comparing the numbers that they produce with numbers obtained from some kind of measurement. This is especially true for Total Maximum Daily Load (TMDL) analyses. Many TMDLs are under court order and have a deadline for completion. The model user needs to determine whether local water quality problems because of excessive sediment loading potentially exist in a watershed. The user also needs to apply the model to develop recommended approaches for predicting changes in sediment budgets in response to changes in proposed Best Management Practices, including precision farming and good agricultural land management. The objective of our research was to develop a simplified approach to evaluate sediment loadings from watersheds and selected land segments within the United States.

## Our Research Approach

- *Model selection* – The predictive model consist of sediment loadings from the Revised Universal Soil Loss Equation (RUSLE).
- *Programming* –  This spreadsheet model is designed to run on computers using Windows operating environments.
- *Databases* – The model contains a database consisting of watersheds in the United States that are subdivided by state boundaries. The watersheds are displayed on a map and are mouse clickable to access smaller scales (i.e., state boundaries, etc.). A comprehensive soils database and a major land resource area database is also part of this modeling package.
- *Help* –  An on-line user help tool for estimating the model input parameters was developed for this model. It will provide guidance on estimating the appropriate model parameters for estimating sediment delivery.

**Benefits**
- Development of a simplified approach will be used to evaluate sediment loading from watersheds and selected land segments within the United States.
- Increased accuracy of environmental and human risk assessments will result from use of the model for TMDL assessments.
- Use of the model could be used to target best management practices which will help reduce the sediment loads to stream channels and minimize water quality impacts.

**Purpose**
- TMDL development supports EPA's efforts to provide a means of assessing environmental issues and ultimately reducing the impacts of environmental stressors.
- TMDL research supports federal TMDL assessment requirements.

**Milestones**
- The modeling approach was presented at two TMDL practitioners' workshops held in Chicago, IL and San Diego, CA. The model was well received at both workshops.
- June 2000 : Draft Protocol/Prototype for estimating loadings of sediments to surface water by the Office of Water, Regions and States.
- The State of Louisiana will be the first state to use the model for developing some 300 TMDLs that are currently under court order to be developed by spring 2001.
- The model will be used in the State of Georgia for its TMDL effort that is comprised of Federal, State and University personnel.

**Participants**
- U.S. Environmental Protection Agency, Office of Research and Development, National Exposure Research Laboratory, Ecosystems Research Division.

| For More Information: | Contact:<br>Robert Carousel<br>carousel.robert@epa.gov | The model will be supported through the EPA Center for Exposure Assessment Modeling<br>http://www.epa.gov/ceampubl |
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